

Application Serial No. 10/769,546

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CENTRAL FAX CENTER Docket No. 2002-037R1
PATENT
MAR 07 2007

REMARKS

Claims 100-108, 161-177 are pending in the above-referenced patent application. Claims 178-191 have been withdrawn from further consideration by the Examiner as being drawn to a non-elected invention.

Rejection Under 35 U.S.C. § 102(b) (US 5,034,121 to Budin et al.)

Claims 161-167 are rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by U.S. Patent No. 5,034,121 to Budin et al. The applicant respectfully traverses.

Budin et al. is directed to improving the quality of an electroerosion machining fluid by providing a better filtering system that periodically reverses the flow of the machining fluid being filtered (see column 2, lines 15-30). The filter assembly in one embodiment of Budin et al. uses a plural filter membranes in parallel (column 3, lines 49-55), however this embodiment is not shown in the drawings and the reference does not disclose that each filter membrane has its own permeate conduits or separate backflush conduits.

Independent claim 161 requires, inter alia, an apparatus for filtration of each of a plurality of dispersions with each of the permeate conduits being positioned to receive permeate from a membrane of said plurality of membranes that is separate from any of said plurality of membranes from which any other of said plurality of permeate conduits is positioned to receive permeate; and ... each of said backflush conduits being oriented for backflushing a membrane that is separate from any membrane which any other of said plurality of backflush conduits is oriented to backflush. (Emphasis added.)

Budin et al. fails to anticipate independent claim 161 because it fails to disclose separate permeate conduits and separate backflush conduits for a plurality of membranes that can filter a plurality of dispersions. Clearly, Budin et al. is concerned with filtering only one fluid. Thus, there are at least 3 elements of claim 161 that are not disclosed by Budin et al. Instead, the parallel filter embodiment of Budin et al. only seeks to provide "a large filter surface with small space requirements" for the single electroerosion machining fluid that is being filtered in the reference (quote is from column 3, line 54). For these reasons, the applicant respectfully requests that the rejection of claim 161 and the claims dependent thereon (claims 162-167) be withdrawn.

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Rejection Under 35 U.S.C. § 102(e) (US 6,949,355 to Yamanishi et al.) and Rejections Under 35 U.S.C. § 103(a) (US 6,949,355 to Yamanishi et al. in view of US 4,974,458 to Koike)

Claims 161-168 are rejected under 35 U.S.C. § 102(e) as allegedly being anticipated by U.S. Patent No. 6,949,355 to Yamanishi et al.

Claims 169-177 are rejected under 35 U.S.C. § 103(a) as allegedly being anticipated by U.S. Patent No. 6,949,355 to Yamanishi et al. in view of US 4,974,458 to Koike. The applicant respectfully disagrees.

The Applicant respectfully traverses these rejections.

Yamanishi et al. disclose a microfabricated assembly for enriching rare cells of a blood sample, including an embodiment that is an automated system (see, e.g., column 4, lines 17-24). The enriched rare cells are collected from the system (see, e.g., column 17, lines 54-59). Yamanishi et al. suggests that there might be more than one "separation chamber" in the automated system (see column 10, lines 48-49) by stating that "one or more" separation chambers might be used in the automated system.

Although Yamanishi et al. is a long reference that discloses a number of embodiments, in the Applicants reading of the reference, the claimed invention is different because the back flushing conduits are distinct from the permeate conduits, for example as shown located optimally concentric with, and close to, the membrane in Figure 2. Claim 161 requires "...a plurality of backflushing conduits for directing a backflushing liquid through said filter membranes". Thus, there are separate and parallel sets of conduits for permeate and backflushing liquid. This is clearly illustrated in the specification in Figure 2C. This is a unique and important feature of the invention that allows the backflushing sequence to be optimized and makes the backflushing more efficient than if the permeate and backflushing conduit were the same. The great advantage is that the backflushing fluid can be a pure liquid containing no solids and when introduced very near and concentric with the filtration membrane via a separate conduit, as shown for example in Figure 2C, has the beneficial effect of preventing a cake formation on the permeate side of the filtration membrane. Even very small backflushing injection volumes can have a large beneficial effect since they are inject at the surface of the membrane and create a radial flow pattern which displaces the permeate prior to generation of sufficient static pressure to starting reverse flow. This becomes more important in the high solids case or when significant concentrations of solid particles with hydrodynamic radii near the

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pore size of the filtration membrane are present in the permeate i.e., broad particle size distributions.

In contrast, Yamanishi et al. show a wash fluid connection in fig. 16A and 16B numbered 508 and described as a valve (see col. 5, line59). The wash pump is connected to the post-filtration chamber via a valve. *Id.* Backflushing with this type of arrangement would push permeate present in the post-filtration chamber backwards through the membrane fouling the backside of the membrane. The separate washing conduit and its geometric relationship to the membrane as in the claimed invention and disclosed in the specification was specifically developed to mitigate this effect.

The Applicant respectfully requests reconsideration of these rejections.

Rejections Under 35 U.S.C. § 103(a) (US 5,034,121 to Budin et al. in view of US 4,859,324 to Levy et al.) and Rejections Under 35 U.S.C. § 103(a) (US 5,034,121 to Budin et al. in view of US 4,859,324 to Levy et al. and further in view of US 6,461,513 to Jen)

Claims 100-104, 107 and 108 are rejected under 35 U.S.C. § 103(a) as allegedly being anticipated by U.S. Patent No. 5,034,121 to Budin et al. in view of US 4,859,324 to Levy et al.

Claims 105 and 106 are rejected under 35 U.S.C. § 103(a) as allegedly being anticipated by U.S. Patent No. 5,034,121 to Budin et al. in view of US 4,859,324 to Levy et al. and further in view of US 6,461,513 to Jen.

The Applicant respectfully traverses these rejections.

Budin is discussed above, and a key difference from Budin et al. as well as Levy et al. is that both references describe a crossflow filtration apparatus with backflushing and flow reversal, whereas the claimed invention has a dead end filtration for each channel. The claimed invention has advantages in an automated robotic system by enabling reduced wetted surface area relative to a crossflow apparatus with similar filtration area. In particular with high-solids content fluids, crossflow filtration gives a high tangential velocity that is effective in inhibiting cake formation on the inlet side of the membrane. Dead-end filtration in contrast is more difficult since the tangential flow is low or non-existent and high-impedance cake formation is unavoidable.

The claimed invention is a dead-end filtration device capable of high-solids concentration separation with unit-area permeate flows comparable to a cross flow device, which distinguishes the applied references, making the claimed invention non-obvious. For example, an

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advantageous mode of operation of the claimed invention, but not possible in the apparatus described by the references, is when the solvents for the backflushing fluid are different from the permeate. During startup a solvent having different properties than the filtrate (but still miscible) can be used to initially wet the the filtration membrane e.g. hydrophobic filtration membranes must be wetted by a non-polar solvent before filtration of aqueous mixtures is possible.

For these reasons, the Applicant believes the claimed invention is non-obvious and respectfully requests reconsideration of these rejections.

CONCLUSION

In view of the foregoing, the applicant requests examination on the merits.

The applicant is paying the filing fees based on the as-amended claims pursuant to the transmittal documents submitted herewith. If necessary, the Examiner is hereby authorized to charge any fees required in connection with this application, throughout the pendency thereof, to Deposit Account No. 50-0496.

Respectfully submitted,



Ronald A. Krasnow
Reg. No. 33,321
Attorney for Applicant(s)

Date: March 7, 2007

Symyx Technologies, Inc.
415 Oakmead Parkway
Sunnyvale, California 94085
Tel.: (408) 773-4024 Fax: (408) 773-4029